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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/729,939
Filing Date: December 05, 2000
Appellant(s): JOSHI ET AL.

Jon D. Shutter
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/9/2008 appealing from the Office action mailed 7/24/2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,438,517	Sennott et al.	9-1995
6,009,394	Bargar et al.	12-1999
6,133,867	Eberwine et al.	10-2000
6,253,164	Rohm et al.	6-2001
6,639,592	Dayanand et al.	10-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 8-14, 16-27, 29-34 and 36-37 rejected under 35 U.S.C. 103 (a) as being unpatentable over Sennott et al. (U.S. Patent No. 5,438,517), in view of Bargar et al. (U.S. Patent No. 6,009,394).

As to claim 1, Sennott et al. teaches a method for representing geographic features in a computer-based system (See abstract), comprising:

providing a first computer-usable database storing a plurality of data points specifying latitude and longitude coordinates of locations along at least one geographic feature (See column 49, lines 58-68; column 50, lines 1-57);

the data points specifying latitude and longitude coordinates to generate a plurality of control points for the polynomial spline (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

storing the control points in a second computer-usable database, the control points being usable for representing the geometry of the at least one geographic feature in the computer-based system (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation.

Bargar et al. teaches a system and method for interfacing a 2D or 3D movement space to a high dimensional sound synthesis control space (See abstract), in which he teaches fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation (See column 6, lines 60-64).

Therefore, it would have been obvious to a person having ordinary skill in the art to use the teachings of applying a least squares approximation to a two-dimensional spline function as taught in Bargar et al. to Sennott et al.'s vehicle position

determination system and method in order to link positions/data points smoothly for the polynomial spline (See Bargar et al., column 6, lines 56-64).

As to claim 2, Sennott et al. as modified, teaches wherein the data points are selected from the group consisting of coordinate pairs and coordinate triples (See Sennott et al., column 15, lines 27-37; column 41, lines 7-14; column 50, lines 5-15).

As to claim 3, Sennott et al. as modified, teaches configuring the number of control points (See Sennott et al., column 50, lines 5-57).

As to claims 8, 20, 24 and 30, Sennott et al. as modified, teaches incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); wherein the spline control points are derived by incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See Sennott et al.,

column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); wherein the processor is configured to incorporate in the least squares approximation a bearing value associated with a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64).

As to claims 9, 21, 25 and 31, Sennott et al. as modified, teaches weighting a node included in the plurality of data points in the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); weighting a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); wherein the spline controls points are derived using the least squares approximation by weighting a node included, in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines

56-64); wherein the processor is configured to weight a node included in the plurality of data points in the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64).

As to claims 10, 22, 26 and 32, Sennott et al. as modified, teaches employing regularization in computing the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); employing regularization in the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); wherein the spline control points are derived by employing regularization in the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); wherein the processor is configured to employ regularization in computing the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5;

column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64).

As to claims 11, 17, 27 and 33, Sennott et al. as modified, teaches identifying a straight section of the at least one geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Bargar et al., column 6, lines 56-64); and storing in the second computer-usable database the data points corresponding to the straight section (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Bargar et al., column 6, lines 56-644); identifying a straight section of a geographic feature based on the data points (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Bargar et al., column 6, lines 56-64); and storing in the computer-usable database the data points corresponding to the straight section of the geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Bargar et al., column 6, lines 56-64); wherein the processor is configured to determine whether the geographic feature includes a straight section, and if so, linearly interpolate the data points representing the straight section (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Bargar et al., column 6, lines 56-64); wherein the processor is configured to determine

whether the at least one geographic feature has a substantially straight section, and if so, to store in the second computer-usable database the data points corresponding to the straight section (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Bargar et al., column 6, lines 56-64).

As to claims 12, 18 and 34, Sennott et al. as modified, teaches computing the control points only for one or more curved sections of the at least one geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); computing the control points only for one or more curved sections of the geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); wherein the processor computes the control points only for one or more curved sections of the at least one geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4).

As to claim 13, Sennott et al. as modified, teaches computing the control points such that the tangent to the spline approximation of a curved section of the at least one geographic feature and the tangent to the straight section are equal at the point at which the curved and straight section meet (See Sennott et al., column 67, lines 9-19).

As to claim 14, Sennott et al. teaches a method of displaying on a computer output device a function representing a geographic feature (See abstract), comprising:

retrieving from a computer-usable database a plurality of spline control points associated with the geographic feature (See column 49, lines 58-68; column 50, lines 1-57), a plurality of data points specifying latitude and longitude coordinates of locations along the geographic feature (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

calculating a polynomial spline using the spline control points to generate the function representing the geometry of the geographic feature (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); and displaying the function on the computer output device (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach the spline control points being derived, using a least squares approximation.

Bargar et al. teaches a system and method for interfacing a 2D or 3D movement space to a high dimensional sound synthesis control space (See abstract), in which he teaches the spline control points being derived, using a least squares approximation (See column 24, lines 35-44).

Therefore, it would have been obvious to a person having ordinary skill in the art to use the teachings of applying a least squares approximation to a two-dimensional spline function as taught in Bargar et al. to Sennott et al.'s vehicle position determination system and method in order to link positions/data points smoothly for the polynomial spline (See Bargar et al., column 6, lines 56-64).

As to claim 16, Sennott et al. teaches a method of generating a computer-usable database that represents feature geometry using a plurality of spline control points associated with a plurality of geographic features (See abstract), comprising:

providing a predetermined database that represents feature geometry using a plurality of data points specifying latitude and longitude coordinates of locations along the geographic features (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57);

for each of the geographic features, retrieving a corresponding set of data points specifying latitude and longitude coordinates from the predetermined database (See column 21, lines 64-68; column 22, lines 1-3); and

fitting a polynomial spline to each of the geographic features by computing the corresponding set of data points specifying latitude and longitude coordinates (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

storing the plurality of spline control points in the computer-usable database (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach plurality of control points yielding the least squares approximation.

Bargar et al. teaches a system and method for interfacing a 2D or 3D movement space to a high dimensional sound synthesis control space (See abstract), in which he teaches plurality of control points yielding the least squares approximation (See column 24, lines 35-44).

Therefore, it would have been obvious to a person having ordinary skill in the art to use the teachings of applying a least squares approximation to a two-dimensional spline function as taught in Bargar et al. to Sennott et al.'s vehicle position determination system and method in order to link positions/data points smoothly for the polynomial spline (See Bargar et al., column 6, lines 56-64).

As to claim 19, Sennott et al. as modified, teaches computing the control points for a geographic feature that has a curved section and an adjoining straight section such that a bearing value at an endpoint of the curved section equals a corresponding bearing value at an endpoint of the straight section that meets the curved section (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4).

As to claim 23, Sennott et al. teaches a system for displaying a function representing the geometry of a geographic feature (See abstract), comprising:

a database storing one or more spline control points associated with the geographic feature (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57), from a plurality of data points specifying latitude and longitude coordinates of locations along the geographic feature (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

a processor configured to compute a polynomial spline using the spline control points to generate the function representing the geometry of the geographic feature (See column 17, lines 18-28, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

and a display device for displaying the polyline (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach the spline control points being derived, using a least squares approximation.

Bargar et al. teaches a system and method for interfacing a 2D or 3D movement space to a high dimensional sound synthesis control space (See abstract), in which he teaches the spline control points being derived, using a least squares approximation (See column 24, lines 35-44).

Therefore, it would have been obvious to a person having ordinary skill in the art to use the teachings of applying a least squares approximation to a two-dimensional spline function as taught in Bargar et al. to Sennott et al.'s vehicle position determination system and method in order to link positions/data points smoothly for the polynomial spline (See Bargar et al., column 6, lines 56-64).

As to claim 29, Sennott et al. teaches a system for generating a plurality of spline control points that represent feature geometry (See abstract), comprising:

a first computer-usable database for storing a plurality of data points specifying latitude and longitude coordinates of locations along at least one geographic feature (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57); and

a processor configured to the data points specifying latitude and longitude coordinates to generate the plurality of control points for a polynomial spline (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

a second computer-usable database for storing the control points (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach apply a least squares approximation.

Bargar et al. teaches a system and method for interfacing a 2D or 3D movement space to a high dimensional sound synthesis control space (See abstract), in which he teaches apply a least squares approximation (See column 24, lines 35-44).

Therefore, it would have been obvious to a person having ordinary skill in the art to use the teachings of applying a least squares approximation to a two-dimensional spline function as taught in Bargar et al. to Sennott et al.'s vehicle position determination system and method in order to link positions/data points smoothly for the polynomial spline (See Bargar et al., column 6, lines 56-64).

As to claim 36, Sennott et al. as modified, teaches wherein the geographic feature is a road (See Sennott et al., column 50, lines 45-52).

As to claim 37, Sennott et al. as modified, teaches wherein the data points further specifying altitude (See Sennott et al., column 21, lines 64-68; column 22, lines 1-3; column 29, lines 45-52).

3. Claims 4, 15, 28 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sennott et al. (U.S. Patent No. 5,438,517) in view of Bargar et al. (U.S. Patent No. 6,009,394), in further view of Dayanand et al. (U.S. Patent No. 6,639,592).

As to claim 4, Sennott et al. still does not teach wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-

rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS.

Dayanand et al. teaches curve network modeling (See abstract), in which he teaches wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS (See abstract; column 2, lines 27-29; column 4, lines 20-29).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Sennott et al., to include wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Sennott et al., by the teachings of Dayanand et al. because wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS would enable a computer modeler to represent arbitrary curved surfaces very accurately (See Dayanand et al., column 1, lines 44-52).

As to claims 15, 28 and 35, Sennott et al. as modified, teaches wherein the polynomial spline is selected from the group consisting of uniform nonrational B-spline,

non-uniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29); wherein the polynomial spline is selected from the group consisting of uniform nonrational B-spline, non-uniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29); wherein the polynomial spline is selected from the group consisting of a uniform nonrational B-spline, nonuniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29).

4. Claims 5-7 rejected under 35 U.S.C. 103(a) as being unpatentable over Sennott et al. (U.S. Patent No. 5,438,517) in view Bargar et al. (U.S. Patent No. 6,009,394), in further view of Rohm et al. (U.S. Patent No. 6,253,164)

As to claim 5, Sennott et al., still does not teach defining a knot sequence for the polynomial spline.

Rohm et al. teaches curves and surfaces modeling based on a cloud of points (See abstract), in which he teaches defining a knot sequence for the polynomial spline (See column 4, lines 17-21).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Sennott et al., to include defining a knot sequence for the polynomial spline.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Sennott et al., by the teachings of Rohm et al. because defining a knot sequence for the polynomial spline would allow the modeler to only capture spatial information and the system will generate all surfaces automatically (See Rohm et al., column 2, lines 32-34).

As to claim 6, Sennott et al. as modified, teaches manually defining the knot sequence (See Rohm et al., column 4, lines 17-33).

As to claim 7, Sennott et al. as modified, teaches storing the knot sequence in the second computer-usable database (See Rohm et al., column 4, lines 17-33).

5. Claims 1-3, 8-14, 16-27, 29-34 and 36-37 rejected under 35 U.S.C. 103 (a) as being unpatentable over Sennott et al. (U.S. Patent No. 5,438,517), in view of Eberwine et al. (U.S. Patent No. 6,133,867).

As to claim 1, Sennott et al. teaches a method for representing geographic features in a computer-based system (See abstract), comprising:

providing a first computer-usable database storing a plurality of data points specifying latitude and longitude coordinates of locations along at least one geographic feature (See column 49, lines 58-68; column 50, lines 1-57);

the data points specifying latitude and longitude coordinates to generate a plurality of control points for the polynomial spline (See column 17, lines 47-55; column

50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

storing the control points in a second computer-usable database, the control points being usable for representing the geometry of the at least one geographic feature in the computer-based system (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation.

Eberwine et al. teaches a Integrated air traffic management and collision avoidance system (See abstract), in which he teaches fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation (See column 10, lines 1-21; column 14, lines 50-57).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified to Sennott et al., to include fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified to Sennott et al., by the teachings of Eberwine et al. because fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation would prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

As to claim 2, Sennott et al. as modified, teaches wherein the data points are selected from the group consisting of coordinate pairs and coordinate triples (See Sennott et al., column 15, lines 27-37; column 41, lines 7-14; column 50, lines 5-15).

As to claim 3, Sennott et al. as modified, teaches configuring the number of control points (See Sennott et al., column 50, lines 5-57).

As to claims 8, 20, 24 and 30, Sennott et al. as modified, teaches incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also See Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); wherein the spline control points are derived by incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines

6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); wherein the processor is configured to incorporate in the least squares approximation a bearing value associated with a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57).

As to claims 9, 21, 25 and 31, Sennott et al. as modified, teaches weighting a node included in the plurality of data points in the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); weighting a node included in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); wherein the spline controls points are derived using the least squares approximation by weighting a node included, in the plurality of data points (See Sennott et al., column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55;

Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); wherein the processor is configured to weight a node included in the plurality of data points in the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57).

As to claims 10, 22, 26 and 32, Sennott et al. as modified, teaches employing regularization in computing the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Bargar et al., column 6, lines 56-64); employing regularization in the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); wherein the spline control points are derived by employing regularization in the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); wherein the processor is configured to employ regularization in computing the least squares approximation (See Sennott et al., column 17, lines 47-55; column 50, lines 58-

66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57).

As to claims 11, 17, 27 and 33, Sennott et al. as modified, teaches identifying a straight section of the at least one geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57) and storing in the second computer-usable database the data points corresponding to the straight section (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); identifying a straight section of a geographic feature based on the data points (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Bargar et al., column 6, lines 56-64); and storing in the computer-usable database the data points corresponding to the straight section of the geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57); wherein the processor is configured to determine whether the geographic feature includes a straight section, and if so, linearly interpolate the data points representing the straight section (See Sennott et al., column 46, lines 21-30;

column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57) wherein the processor is configured to determine whether the at least one geographic feature has a substantially straight section, and if so, to store in the second computer-usable database the data points corresponding to the straight section (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4; Also see Eberwine et al., column 10, lines 1-21; column 14, lines 50-57).

As to claims 12, 18 and 34, Sennott et al. as modified, teaches computing the control points only for one or more curved sections of the at least one geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); computing the control points only for one or more curved sections of the geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); wherein the processor computes the control points only for one or more curved sections of the at least one geographic feature (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4).

As to claim 13, Sennott et al. as modified, teaches computing the control points such that the tangent to the spline approximation of a curved section of the at least one

geographic feature and the tangent to the straight section are equal at the point at which the curved and straight section meet (See Sennott et al., column 67, lines 9-19).

As to claim 14, Sennott et al. teaches a method of displaying on a computer output device a function representing a geographic feature (See abstract), comprising:

retrieving from a computer-usable database a plurality of spline control points associated with the geographic feature (See column 49, lines 58-68; column 50, lines 1-57), a plurality of data points specifying latitude and longitude coordinates of locations along the geographic feature (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

calculating a polynomial spline using the spline control points to generate the function representing the geometry of the geographic feature (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); and displaying the function on the computer output device (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach the spline control points being derived, using a least squares approximation.

Eberwine et al. teaches a Integrated air traffic management and collision avoidance system (See abstract), in which he teaches fitting a polynomial spline to the

at least one geographic feature by applying a least squares approximation (See column 10, lines 1-21; column 14, lines 50-57).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified to Sennott et al., to include fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified to Sennott et al., by the teachings of Eberwine et al. because fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation would prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

As to claim 16, Sennott et al. teaches a method of generating a computer-usable database that represents feature geometry using a plurality of spline control points associated with a plurality of geographic features (See abstract), comprising:

providing a predetermined database that represents feature geometry using a plurality of data points specifying latitude and longitude coordinates of locations along the geographic features (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57);

for each of the geographic features, retrieving a corresponding set of data points specifying latitude and longitude coordinates from the predetermined database (See column 21, lines 64-68; column 22, lines 1-3); and

fitting a polynomial spline to each of the geographic features by computing the corresponding set of data points specifying latitude and longitude coordinates (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

storing the plurality of spline control points in the computer-usable database (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach plurality of control points yielding the least squares approximation.

Eberwine et al. teaches a Integrated air traffic management and collision avoidance system (See abstract), in which he teaches fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation (See column 10, lines 1-21; column 14, lines 50-57).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified to Sennott et al., to include fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified to Sennott et al., by the teachings of

Eberwine et al. because fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation would prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

As to claim 19, Sennott et al. as modified, teaches computing the control points for a geographic feature that has a curved section and an adjoining straight section such that a bearing value at an endpoint of the curved section equals a corresponding bearing value at an endpoint of the straight section that meets the curved section (See Sennott et al., column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4).

As to claim 23, Sennott et al. teaches a system for displaying a function representing the geometry of a geographic feature (See abstract), comprising:

a database storing one or more spline control points associated with the geographic feature (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57), from a plurality of data points specifying latitude and longitude coordinates of locations along the geographic feature (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

a processor configured to compute a polynomial spline using the spline control points to generate the function representing the geometry of the geographic feature (See column 17, lines 18-28, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

and a display device for displaying the polyline (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach the spline control points being derived, using a least squares approximation.

Eberwine et al. teaches a Integrated air traffic management and collision avoidance system (See abstract), in which he teaches fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation (See column 10, lines 1-21; column 14, lines 50-57).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified to Sennott et al., to include fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified to Sennott et al., by the teachings of Eberwine et al. because fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation would prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or

terrain collisions (See Eberwine et al., column 1, lines 11-22).

As to claim 29, Sennott et al. teaches a system for generating a plurality of spline control points that represent feature geometry (See abstract), comprising:

a first computer-usable database for storing a plurality of data points specifying latitude and longitude coordinates of locations along at least one geographic feature (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57); and

a processor configured to the data points specifying latitude and longitude coordinates to generate the plurality of control points for a polynomial spline (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

a second computer-usable database for storing the control points (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

Sennott et al. does not teach apply a least squares approximation.

Eberwine et al. teaches a Integrated air traffic management and collision avoidance system (See abstract), in which he teaches fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation (See column 10, lines 1-21; column 14, lines 50-57).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified to Sennott et al., to include fitting

a polynomial spline to the at least one geographic feature by applying a least squares approximation.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified to Sennott et al., by the teachings of Eberwine et al. because fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation would prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

As to claim 36, Sennott et al. as modified, teaches wherein the geographic feature is a road (See Sennott et al., column 50, lines 45-52).

As to claim 37, Sennott et al. as modified, teaches wherein the data points further specifying altitude (See Sennott et al., column 21, lines 64-68; column 22, lines 1-3; column 29, lines 45-52).

6. Claims 4, 15, 28 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sennott et al. (U.S. Patent No. 5,438,517) in view of Eberwine et al. (U.S. Patent No. 6,133,867), in further view of Dayanand et al. (U.S. Patent No. 6,639,592).

As to claim 4, Sennott et al. as modified, still does not teach wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline,

non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS.

Dayanand et al. teaches curve network modeling (See abstract), in which he teaches wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS (See abstract; column 2, lines 27-29; column 4, lines 20-29).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Sennott et al. as modified, to include wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Sennott et al. as modified, by the teachings of Dayanand et al. because wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS would enable a computer modeler to represent arbitrary curved surfaces very accurately (See Dayanand et al., column 1, lines 44-52).

As to claims 15, 28 and 35, Sennott et al. as modified, teaches wherein the polynomial spline is selected from the group consisting of uniform nonrational B-spline,

non-uniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29); wherein the polynomial spline is selected from the group consisting of uniform nonrational B-spline, non-uniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29); wherein the polynomial spline is selected from the group consisting of a uniform nonrational B-spline, nonuniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29).

7. Claims 5-7 rejected under 35 U.S.C. 103(a) as being unpatentable over Sennott et al. (U.S. Patent No. 5,438,517) in view Eberwine et al. (U.S. Patent No. 6,133,867), in further view of Rohm et al. (U.S. Patent No. 6,253,164)

As to claim 5, Sennott et al. as modified, still does not teach defining a knot sequence for the polynomial spline.

Rohm et al. teaches curves and surfaces modeling based on a cloud of points (See abstract), in which he teaches defining a knot sequence for the polynomial spline (See column 4, lines 17-21).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Sennott et al. as modified, to include defining a knot sequence for the polynomial spline.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Sennott et al. as modified, by the teachings of Rohm et al. because defining a knot sequence for the polynomial spline would allow the modeler to only capture spatial information and the system will generate all surfaces automatically (See Rohm et al., column 2, lines 32-34).

As to claim 6, Sennott et al. as modified, teaches manually defining the knot sequence (See Rohm et al., column 4, lines 17-33).

As to claim 7, Sennott et al. as modified, teaches storing the knot sequence in the second computer-usable database (See Rohm et al., column 4, lines 17-33).

(10) Response to Argument

In response to applicants' arguments regarding "***Claims I and 29 are not obvious in view of the combination of Sennott and Bargar because these references fail to disclose or suggest the claim element of applying a least squares approximation to data points specifying latitude and longitude coordinates to generate the control points for the polynomial spline***," the arguments have been fully considered but are not found to be persuasive, because Sennott discloses a system and method for vehicle position determination (See abstract), wherein a navigational system is used to determine a autonomous vehicle position (See column 1, lines 12-16). This is done by determining path generation or

path planning which can be done by fitting polynomial splines to the paths between objective points (See column 51, lines 31-67; column 52, lines 1-5; column 55,lines 64-67; column 56, lines 1-28). Furthermore, Sennott discloses that a path is sequence of postures and postures are used to model parts or route, paths, nodes and consist of information of a given point which can be latitude or longitude points (See column 50,lines 16-26; column 58, lines 56-62). Sennott also, discloses using a least square fit to determine objects in a path (See column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55). However, Sennott does not explicitly teach that the calculation for determining objects (geographic features) in the path (polynomial spline) is done my applying the least square approximation to the polynomial spline (which is the path), so the examiner has add the Bargar reference and the Eberwine reference (which will be addressed below) in order to show that in the navigation field "least squares approximation" can be a method applied to the polynomial spline in order to determine the path. Bargar discloses calculating or smoothing the path by applying a least approximation to the splines (See column 6, lines 53-64). Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott with the method of applying least square approximation to the polynomial spline taught in Bargar in order to determine a correct navigational path and to link positions/data points smoothly for the polynomial spline (See Bargar et al., column 6, lines 56-64).

In response to applicants' arguments regarding "***Bargar (and the combination of Bargar and Sennott) do not disclose the claim element of applying a least squares approximation to generate the control points for a polynomial spline,***" the

arguments have been fully considered but are not found to be persuasive, because the examiner relies on Sennott teaches that a path can be determined fitting a polynomial spline and that the points disclosed in the path (control points) can be latitude and longitude (See Sennott et al, column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55), and combined with the teaching of Bargar who teaches that when calculating a smooth path a least squares approximation equation can be used to fit the polynomial spline and was a method used at the time in order to determine the path (See Bargar et al.,. column 6, lines 53-64).

In response to applicants' arguments regarding "***Both Sennott and Bargar not only fail to disclose the claim element but also fail to predict this result of the claimed invention,***" the arguments have been fully considered but are not found to be persuasive, because the examiner is arguing that the time of the invention it was common in the navigation field to use least approximation squares to a polynomial in order to determine a path of a vehicle, aircraft or the like. Furthermore, the requirements for 35 USC 102 only requires anticipation, the prior art does not have to go any further by predicting outcomes. The requirements for 35 USC 103 only requires a teaching of obviousness and the prior art is not required to go any further by predicting results. Because Sennott does not really elaborate on how the "least square approximation" is used to determine the object in the path the examiner has brought in the teaching of Bargar and even Eberwine in order to show such teaching were common at the time of the invention.

In response to applicants' arguments regarding "***Claims 14 and 23 are not obvious in view of the combination of Sennott and Bargar because these references fail to disclose or suggest the claim dement of the spline control points are derived "using at least squares approximation " from data points specifying latitude and longitude coordinates,***" the arguments have been fully considered but are not found to be persuasive, because Sennott discloses a system and method for vehicle position determination (See abstract), wherein a navigational system is used to determine a autonomous vehicle position (See column 1, lines 12-16). This is done by determining path generation or path planning which can be done by fitting polynomial splines to the paths between objective points (See column 51, lines 31-67; column 52, lines 1-5; column 55,lines 64-67; column 56, lines 1-28). Furthermore, Sennott discloses that a path is sequence of postures and postures are used to model parts or route, paths, nodes and consist of information of a given point which can be latitude or longitude points (See column 50,lines 16-26; column 58, lines 56-62). Sennott also, discloses using a least square fit to determine objects in a path (See column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55). However, Sennott does not explicitly teach that the calculation for determining objects (geographic features) in the path (polynomial spline) is done my applying the least square approximation to the polynomial spline (which is the path), so the examiner has add the Bargar reference and the Eberwine reference (which will be addressed below) in order to show that in the navigation field "least squares approximation" can be a method applied to the polynomial spline in order to determine the path. Bargar discloses

calculating or smoothing the path by applying a least approximation to the splines (See column 6, lines 53-64). Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott with the method of applying least square approximation to the polynomial spline taught in Bargar in order to determine a correct navigational path and to link positions/data points smoothly for the polynomial spline (See Bargar et al., column 6, lines 56-64).

In response to applicants' arguments regarding "***Claim 16 is not obvious in view of the combination of Sennott and Bargar because these references fail to disclose or suggest the claim element of fitting a polynomial splint by computing a plurality of control points yielding the "least squares approximation" of the data points specifying latitude and longitude coordinates***," the arguments have been fully considered but are not found to be persuasive, because Sennott discloses a system and method for vehicle position determination (See abstract), wherein a navigational system is used to determine a autonomous vehicle position (See column 1, lines 12-16). This is done by determining path generation or path planning which can be done by fitting polynomial splines to the paths between objective points (See column 51, lines 31-67; column 52, lines 1-5; column 55,lines 64-67; column 56, lines 1-28). Furthermore, Sennott discloses that a path is sequence of postures and postures are used to model parts or route, paths, nodes and consist of information of a given point which can be latitude or longitude points (See column 50,lines 16-26; column 58, lines 56-62). Sennott also, discloses using a least square fit to determine objects in a path (See column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55). However,

Sennott does not explicitly teach that the calculation for determining objects (geographic features) in the path (polynomial spline) is done my applying the least square approximation to the polynomial spline (which is the path), so the examiner has add the Bargar reference and the Eberwine reference (which will be addressed below) in order to show that in the navigation field "least squares approximation" can be a method applied to the polynomial spline in order to determine the path. Bargar discloses calculating or smoothing the path by applying a least approximation to the splines (See column 6, lines 53-64). Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott with the method of applying least square approximation to the polynomial spline taught in Bargar in order to determine a correct navigational path and to link positions/data points smoothly for the polynomial spline (See Bargar et al., column 6, lines 56-64).

In response to applicants' arguments regarding "***Bargar (and the combination of Bargar and Sennott) do not disclose the claim element of fitting a polynomial spline by computing a plurality of control points yielding the "least squares approximation" of the data points specifying latitude and longitude coordinates***," the arguments have been fully considered but are not found to be persuasive, because the examiner relies on Sennott teaches that a path can be determined fitting a polynomial spline and that the points disclosed in the path (control points) can be latitude and longitude (See Sennott et al, column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55), and combined with the teaching of Bargar who teaches that when calculating a smooth path a least squares approximation equation can be used to

fit the polynomial spline and was a method used at the time in order to determine the path (See Bargar et al.,. column 6, lines 53-64).

In response to applicants' arguments regarding "***Both Sennott and Bargar not only fail to disclose the claim element but also fail to predict this result of the claimed invention,***" the arguments have been fully considered but are not found to be persuasive, because arguments have been fully considered but are not found to be persuasive, because the examiner is arguing that the time of the invention it was common in the navigation field to use least approximation squares to a polynomial in order to determine a path of a vehicle, aircraft or the like. Furthermore, the requirements for 35 USC 102 only requires anticipation, the prior art does not have to go any further by predicting outcomes. The requirements for 35 USC 103 only requires a teaching of obviousness and the prior art is not required to go any further by predicting results. Because Sennott does not really elaborate on how the "least square approximation" is used to determine the object in the path the examiner has brought in the teaching of Bargar and even Eberwine in order to show such teaching were common at the time of the invention.

In response to applicants' arguments regarding "***Claims 1 and 29 are not obvious in view of the combination of Sennott and Eberwine because these references fail to disclose or suggest the claim element of applying a least squares approximation to data points specifying latitude and longitude coordinates to generate the control points for the polynomial spline***," the arguments have been fully considered but are not found to be persuasive, because

Sennott discloses a system and method for vehicle position determination (See abstract), wherein a navigational system is used to determine a autonomous vehicle position (See column 1, lines 12-16). This is done by determining path generation or path planning which can be done by fitting polynomial splines to the paths between objective points (See column 51, lines 31-67; column 52, lines 1-5; column 55,lines 64-67; column 56, lines 1-28). Furthermore, Sennott discloses that a path is sequence of postures and postures are used to model parts or route, paths, nodes and consist of information of a given point which can be latitude or longitude points (See column 50,lines 16-26; column 58, lines 56-62). Sennott also, discloses using a least square fit to determine objects in a path (See column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55). However, Sennott does not explicitly teach that the calculation for determining objects (geographic features) in the path (polynomial spline) is done my applying the least square approximation to the polynomial spline (which is the path), so the examiner has add the Bargar (which is addressed above) reference and the Eberwine reference in order to show that in the navigation field "least squares approximation" can be a method applied to the polynomial spline in order to determine the path. Also to show that the path (which contains the control points) can be generated using latitude longitude points). Eberwine discloses a navigational system which determines object motion parameters and determining air paths in order to avoid collisions (See abstract), wherein in order to determine path "least square approximation" Can be applied to the Polynomial spline, wherein the coefficients are latitude and longitude points in order to determine feature paths (See column 10, lines

1-40). Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott (which also disclose altitude information) with the method of applying least square approximation to the polynomial spline taught in Eberwine in order to determine a correct navigational path and to prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

In response to applicants' arguments regarding "***None of the cited references have disclosed the claim element of applying a least squares approximation to data points specifying latitude and longitude coordinates to generate the control points for the polynomial spline,***" the arguments have been fully considered but are not found to be persuasive, because Sennott discloses a system and method for vehicle position determination (See abstract), wherein a navigational system is used to determine a autonomous vehicle position (See column 1, lines 12-16). This is done by determining path generation or path planning which can be done by fitting polynomial splines to the paths between objective points (See column 51, lines 31-67; column 52, lines 1-5; column 55,lines 64-67; column 56, lines 1-28). Furthermore, Sennott discloses that a path is sequence of postures and postures are used to model parts or route, paths, nodes and consist of information of a given point which can be latitude or longitude points (See column 50,lines 16-26; column 58, lines 56-62). Sennott also, discloses using a least square fit to determine objects in a path (See column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55). However, Sennott does not explicitly teach that the calculation for determining objects (geographic features) in the path

(polynomial spline) is done my applying the least square approximation to the polynomial spline (which is the path), so the examiner has add the Bargar (which is addressed above) reference and the Eberwine reference in order to show that in the navigation field "least squares approximation" can be a method applied to the polynomial spline in order to determine the path. Also to show that the path (which contains the control points) can be generated using latitude longitude points). Eberwine discloses a navigational system which determines object motion parameters and determining air paths in order to avoid collisions (See abstract), wherein in order to determine path "least square approximation" can be applied to the Polynomial spline, wherein the coefficients are latitude and longitude points in order to determine feature paths (See column 10, lines 1-40). Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott (which also disclose altitude information) with the method of applying least square approximation to the polynomial spline taught in Eberwine in order to determine a correct navigational path and to prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22). The control points determine and/or are within the navigational path which is what is being calculated in the present application, Sennott and Eberwine.

In response to applicants' arguments regarding "***Claims 14 and 23 are not obvious in view of the combination of Sennott and Eberwine because these references fail to disclose or suggest the claim dement of the spline control points are derived "using at least squares approximation " from data points***

specifying latitude and longitude coordinates, the arguments have been fully considered but are not found to be persuasive, because Sennott discloses a system and method for vehicle position determination (See abstract), wherein a navigational system is used to determine a autonomous vehicle position (See column 1, lines 12-16). This is done by determining path generation or path planning which can be done by fitting polynomial splines to the paths between objective points (See column 51, lines 31-67; column 52, lines 1-5; column 55,lines 64-67; column 56, lines 1-28). Furthermore, Sennott discloses that a path is sequence of postures and postures are used to model parts or route, paths, nodes and consist of information of a given point which can be latitude or longitude points (See column 50,lines 16-26; column 58, lines 56-62). Sennott also, discloses using a least square fit to determine objects in a path (See column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55). However, Sennott does not explicitly teach that the calculation for determining objects (geographic features) in the path (polynomial spline) is done my applying the least square approximation to the polynomial spline (which is the path), so the examiner has add the Bargar (which is addressed above) reference and the Eberwine reference in order to show that in the navigation field "least squares approximation" can be a method applied to the polynomial spline in order to determine the path. Also to show that the path (which contains the control points) can be generated using latitude longitude points). Eberwine discloses a navigational system which determines object motion parameters and determining air paths in order to avoid collisions (See abstract), wherein in order to determine path "least square approximation" Can be applied to the

Polynomial spline, wherein the coefficients are latitude and longitude points in order to determine feature paths (See column 10, lines 1-40). Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott (which also disclose altitude information) with the method of applying least square approximation to the polynomial spline taught in Eberwine in order to determine a correct navigational path and to prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

In response to applicants' arguments regarding "***Eberwine does not disclose or suggest the claim element of the spline control points are derived using a least squares approximation,***" the arguments have been fully considered but are not found to be persuasive, because Eberwine discloses a navigational system which determines object motion parameters and determining air paths in order to avoid collisions (See abstract), wherein in order to determine path "least square approximation" can be applied to the polynomial spline, wherein the coefficients are latitude and longitude points in order to determine feature paths (See column 10, lines 1-40). The coefficients are the control points in the path which are calculated in order to determine the path. Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott (which also disclose altitude information) with the method of applying least square approximation to the polynomial spline taught in Eberwine in order to determine a correct navigational path and to prevent craft-to-craft

collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

In response to applicants' arguments regarding "***Claim 16 is not obvious in view of the combination of Sennott and Eberwine because these references fail to disclose or suggest the claim element of fitting a polynomial splint by computing a plurality of control points yielding the "least squares approximation" of the data points specifying latitude and longitude coordinates***," the arguments have been fully considered but are not found to be persuasive, because Sennott discloses a system and method for vehicle position determination (See abstract), wherein a navigational system is used to determine a autonomous vehicle position (See column 1, lines 12-16). This is done by determining path generation or path planning which can be done by fitting polynomial splines to the paths between objective points (See column 51, lines 31-67; column 52, lines 1-5; column 55,lines 64-67; column 56, lines 1-28). Furthermore, Sennott discloses that a path is sequence of postures and postures are used to model parts or route, paths, nodes and consist of information of a given point which can be latitude or longitude points (See column 50,lines 16-26; column 58, lines 56-62). Sennott also, discloses using a least square fit to determine objects in a path (See column 71, lines 15-20, 55-67; column 72, lines 1-5, lines 40-55). However, Sennott does not explicitly teach that the calculation for determining objects (geographic features) in the path (polynomial spline) is done my applying the least square approximation to the polynomial spline (which is the path), so the examiner has add the Bargar (which is addressed above) reference and the

Eberwine reference in order to show that in the navigation field "least squares approximation" can be a method applied to the polynomial spline in order to determine the path. Also to show that the path (which contains the control points) can be generated using latitude longitude points). Eberwine discloses a navigational system which determines object motion parameters and determining air paths in order to avoid collisions (See abstract), wherein in order to determine path "least square approximation" can be applied to the Polynomial spline, wherein the coefficients are latitude and longitude points in order to determine feature paths (See column 10, lines 1-40). Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott (which also disclose altitude information) with the method of applying least square approximation to the polynomial spline taught in Eberwine in order to determine a correct navigational path and to prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

In response to applicants' arguments regarding "***Eberwine does not disclose or suggest the claim element of fitting a polynomial spline by computing a plurality of control points yielding the least squares approximation***," the arguments have been fully considered but are not found to be persuasive, because Eberwine discloses a navigational system which determines object motion parameters and determining air paths in order to avoid collisions (See abstract), wherein in order to determine path "least square approximation" can be applied to the polynomial spline, wherein the coefficients are latitude and longitude points in order to determine feature paths (See

column 10, lines 1-40). The coefficients are the control points in the path which are calculated in order to determine the path. Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott (which also disclose altitude information) with the method of applying least square approximation to the polynomial spline taught in Eberwine in order to determine a correct navigational path and to prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

In response to applicants' arguments regarding "***None of the cited references have disclosed the claim element of fitting a polynomial spline by computing a plurality of control points yielding the least squares approximation***," the arguments have been fully considered but are not found to be persuasive, because Sennott discloses a system and method for vehicle position determination (See abstract), wherein a navigational system is used to determine a autonomous vehicle position (See column 1, lines 12-16). This is done by determining path generation or path planning which can be done by fitting polynomial splines to the paths between objective points (See column 51, lines 31-67; column 52, lines 1-5; column 55,lines 64-67; column 56, lines 1-28). Furthermore, Sennott discloses that a path is sequence of postures and postures are used to model parts or route, paths, nodes and consist of information of a given point which can be latitude or longitude points (See column 50,lines 16-26; column 58, lines 56-62). Sennott also, discloses using a least square fit to determine objects in a path (See column 71, lines 15-20, 55-67; column 72, lines 1-

5, lines 40-55). However, Sennott does not explicitly teach that the calculation for determining objects (geographic features) in the path (polynomial spline) is done my applying the least square approximation to the polynomial spline (which is the path), so the examiner has add the Bargar (which is addressed above) reference and the Eberwine reference in order to show that in the navigation field "least squares approximation" can be a method applied to the polynomial spline in order to determine the path. Also to show that the path (which contains the control points) can be generated using latitude longitude points). Eberwine discloses a navigational system which determines object motion parameters and determining air paths in order to avoid collisions (See abstract), wherein in order to determine path "least square approximation" can be applied to the Polynomial spline, wherein the coefficients are latitude and longitude points in order to determine feature paths (See column 10, lines 1-40). Therefore, it would have been obvious at the time of the invention to modify the path navigation determined in Sennott (which also disclose altitude information) with the method of applying least square approximation to the polynomial spline taught in Eberwine in order to determine a correct navigational path and to prevent craft-to-craft collisions and craft-to-stationery objects collisions and to prevent aircraft to ground or terrain collisions (See Eberwine et al., column 1, lines 11-22).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Mellissa M. chojnacki

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